Prediction is Production?

Exploring the Relationship Between Language Prediction and Language Production in Younger and Older Adults

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Aspects of Cognition Decline with Age

Healthy Aging

- Memory
- Processing
- Inhibition
- Language Production
Language Production Declines with Age

- More Tip of the Tongue States
- More Filler Words
- Slower Speech
- Simpler Sentences
What is Language Prediction?

- **Language Prediction**: A process during language comprehension in which individuals anticipate upcoming information.

(Buck & Lee, 2013, 0:24:42)
What is Language Prediction?

• Declines in prediction likely related to declines in cognitive resources (Federmeier, 2007; Federmeier et al., 2010; Huettig & Janse, 2016).

• However, some language production theories and studies suggest declines in prediction are related to declines in production (Dell & Chang, 2014; Federmeier, 2007; Federmeier & Kutas, 2005; Federmeier, et al., 2010).

* Processing = language comprehension in this model
Research Questions

1. Is language prediction related to language production?

2. If these processes are related, do age-related declines in language production ability moderate declines in language prediction?
How Can We Measure Prediction?

- Verbs can constrain sentences, making the sentences more predictable. A verb like “peeled” applies to a finite number of objects (e.g., banana, apple, potato), whereas a verb like “drew” can apply to a seemingly endless number of objects.
Current Study

Language Production Measures

Picture Naming: “Type as many animal names as you can in 2 minutes”

Verbal Fluency: “Please describe a favorite childhood memory of yours.”

Typed Elicitation: 

Trial Progression

Verb

Noun

Trial Progression

The
boy
peeled
the
large
banana
while
he
was
sitting
in
the
cafeteria.
Hypotheses

• Younger adults will be better at language prediction and language production.

• Reading times will be faster for the predictable sentences compared to the less predictable sentences.

• Better language production performance will be associated with better language prediction performance (i.e., reading times) across age groups.
Can we encourage prediction?

Main Hypothesis:

Providing participants with an expectation to produce will result in more engagement in language prediction (operationalized as reading times), therefore reading times will be faster in the production block compared to the comprehension block.
Future Directions

1. Examine how other cognitive domains, like memory and processing speed, impact the relationship between language prediction and production.**

1a. Do individual differences in memory and processing speed moderate the relationship between language prediction and production?

1b. Do older adults with better memory and processing speed have preserved language prediction and production abilities?

**This data is being collected concurrently online with the language prediction and production measures mentioned previously.
Future Directions

2. Conduct the study in-person using EEG measures to record brain wave activity.

2a. What processing differences are evident in brainwaves between younger and older adults when reading predictable and less predictable sentences?

2b. Do high-performing older adults’ brainwave patterns resemble the brainwave patterns of younger adults?
Thank You!

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References